

REMARKS

Claim 5 has been cancelled in view of the current amendment to claim 7.

Claims 1- 4, 6- 15, 17-41 and 45 are pending. Claims 16 and 42 have previously been cancelled.

Claims 14-15 and 19-41 have been withdrawn in view of a restriction requirement.

I. Claim Amendments

Claim 7 has been amended to recite the polymer molecular weight range of about 10,000 to about 300,000. Claim 5 has been cancelled in view of the amendment to claim 7. Support for the lower end of the range is found in Claim 6. Claim 6 recited about 10,000 to about 100,000 daltons. Support for the upper end of the range is found at page 9 of the present specification.

New Claim 44 recites a preferred molecular weight range as supported at page 9.

New Claims 45 and 46 recite molar ranges as supported in previously presented current claims 10 and 13, respectively.

New claims 47 recites molar ranges and new claim 48 recites specific monomeric units A, B and C as supported at examples 1-3 and 5.

II. 35 USC 102/103 Rejection in View of Fink et al.

Claims 1-13, 16-18 and 43 are rejected under 35 USC §102 as being anticipated, or in the alternative under 35 USC 103 as being unpatentable, in view of Fink et al. (US 4,542,175).

In view of a species election, Applicants' elected the species of claims 1-13 and 16-18 and 43, exemplified in Example 1 of the specification (page 139). This species is a poly(HEA-co-DMAM-co-AA) terpolymer. HEA is 2-hydroxyethyl acrylate; DMAM is 2-(dimethylamino)ethyl methacrylate; and AA is acrylic acid.

The Office action again asserts Fink et al. (col. 5, line 3 to col. 6, line 42) disclose terpolymers comprising DMAM, HEA and AA. This rejection is respectfully traversed.

A. The Present Claims are Outside the Molecular Weight of Fink et al.

Claim 7, as currently amended, and all of the other claims that are dependent thereon, now recite that the polymer has a molecular weight of about 10,000 to about 300,000 daltons. In contrast, the Fink et al., Abstract and col. 2, lines 44-45, states its synthetic polymer has a molecular weight of at least 500,000. A dalton is, "A unit of mass in biology; 1/12 the mass of an atom of carbon-12 = $1,661 \times 10^{-24}$ g." *Grant & Hackh's Chemical Dictionary*, Fifth Edition,

McGraw-Hill Inc. (1987). Thus, Fink et al. neither anticipates nor suggests a polymer having a molecular weight in the range of about 10,000 to about 300,000 as now required in the claims. The rejection of claims 1-4 and 6-13, 16-18 and 43 as anticipated by or in the alternative as obvious over Fink et al. should therefore be withdrawn.

B. Fink et al. Does Not Select the Present Polymer

Moreover, Fink et al., col. 5, lines 27-30, mentions dimethylaminoethyl methacrylate as one of a number of a large number of monomer component (A) of its synthetic polymers, which include the esters of alpha and beta unsaturated polymerizable monocarboxylic or dicarboxylic acids having at least one basic nitrogen atom in the alcohol portion that are disclosed as the preferred component A in view of their thickening properties (see Col. 5 lines 3-64), but as Applicants previously pointed out, Fink et al. disclosed:

“Those esters which contain an ethylene group as R1 give dispersions which have a tendency to thicken even above a pH of 7 and, to be sure, tend all the more to thicken the smaller the total alcohol portion of the ester is. For this reason, dispersions of polymers containing dimethylaminoethyl methacrylate are not among the preferred embodiments of the invention.”

Thus, Fink et al. does not recommend the selection of DMAM, from the large group of its monomer component A to be used in the reaction with the weakly water soluble monomers of the disclosed monomers (B) or the readily water soluble monomers (C) which are individually or both reacted with the Component (A) monomers to increase the hydrophilicity of the resulting emulsion polymer (see Col. 6, lines 42).

Applicants respectfully assert the Office action's selection of DMAM from Fink's list of components (A), which was clearly not of the preferred group of monomers in Fink et al. with HEA and AA is solely motivated by the impermissible use of hindsight and does not anticipate or make obvious the specific copolymers and terpolymers of Applicants' invention.

As shown in Example 1, for instance, when 9 mmoles of HEA (25.0 gr.) are reacted with 3mmoles of DMAM (11.28 gr.) and 1mmole of AA (1.72 gr.), the resulting polymer would contain more than 70% by weight of the HEA and AA components. This is significantly above any level

of use of these components in Fink et al. even if one skilled in the art should be motivated to select these individual members of the monomers disclosed in Fink et al.

Also, Fink et al. fails to even disclose whether it tested a homopolymer or a copolymer of DMAM. Thus, it does not direct one skilled in the art to select DMAM as a homopolymer or a copolymer. Moreover, even if it did suggest using DMAM, there is no teaching to combine this non-preferred moiety with HEA, which is taught to be disadvantageous in many cases, and acrylic acid which is taught to be disadvantageous in many cases, to arrive at the DMAM-HEA-AA copolymer species elected for examination from the present invention.

III. Dependent Claims 10 and 13 and New Claims 45- 48 Further Distinguish Over Fink et al.

A. Molar Ratios

Fink et al. mentions hydroxyethyl acrylate (HEA) and acrylic acid (AA) as common water soluble members of his component group (C). However, Fink et al. teaches the use of the water soluble monomer components (C), which include the monomers HEA and AA specifically required in Applicants' claimed species of copolymers and terpolymers, should “not amount to more than 30 percent by weight of the synthetic polymer” (See Col. 6, lines 20-24).

This contrasts with Applicants' Examples 1-3 and 5, which show the DMAM-HEA copolymer and DMAM-HPA-AA and PEG-DMAM-AA terpolymers having molar ratios of monomer unit A (DMAM) to Monomer unit B (HEA), (HPA) or (PEG) and monomer unit C (AA) preferred by Applicants to give the required charge density of no more than 2.77 units per 100 daltons. These examples, which are within the scope of the molar ratios of monomer units A to monomer units B to monomer units C in claims 10, 13 and new claims 45-46 and which are specifically claimed in new claims 47 and 48, use more than 30% by weight of the HEA and optional AA component C to arrive at the claimed copolymers and terpolymers of Applicants' elected species. Fink et al. do not disclose or suggest the use of HEA, HPA, PEG and/or AA in the molar ratios claimed in current claims 10, 13, and new claims 45-48, wherein more than 30% by weight of the HEA and AA would be used to prepare the recited co-polymers and terpolymers.

B. Cationic Charge Density

Fink et al. does not teach to obtain the selected charge densities of present Claims 1 and 2. Claim 1 recites an average cationic charge density of 2.77 or less units per 100 daltons molecular

weight at a pH of from about 4 to about 12. Claim 2 recites an average cationic charge density from about 0.01 to about 2.75 units per 100 daltons molecular weight at a pH of from about 4 to about 12. As disclosed in Applicants' specification, the cationic charge relates to the molar ration of the monomer units A, B and optional unit C used in the synthesis of the copolymers and terpolymers.

Paragraph 5 of the previously filed Rule 132 Declaration (by an apparent typographical error it is entitled a "Rule 123 Declaration") explains the present invention co- and terpolymers contrast with the compounds of Fink et al. The charge density of the present amine based polymers is critical for suds stabilization via favorable polymer interactions with soils, thus preventing soil antifoam effects. As wash pH varies so can the cationic charge density which can cause negative interactions with any anionic surfactant that is present, leading to a loss of suds. To reduce the cationic charge and pH dependence of the soil/polymer interaction for the polymer, several alternative mechanisms, together with cationic charge, to increase polymer/soil interactions may be used. They are: 1) lower the overall charge density to minimize cationic charge and pH dependence on the polymer/soil interaction via the introduction of non-charged co-monomers with dimethylaminoethyl methacrylate, and 2) increase hydrophobicity to drive the soil/polymer interaction away from electrostatic and closer to hydrophobic interaction via more hydrophobic non-charged co-monomers with dimethylaminoethyl methacrylate.

C. Molecular Weight

Claim 6 recites a molecular weight of about 10,000 to about 100,000 daltons. New Claim 43 recites a molecular weight of about 35,000 to about 300,000 daltons.

As previously discussed, Claim 7, as currently amended, and all its dependent claims thereon now recite that the polymer has a molecular weight below that of Fink et al. In contrast, the Fink et al., Abstract and col. 2, lines 44-45, state its synthetic polymer has a molecular weight of at least 500,000. Thus, Fink et al. teaches away from all of the claims as currently amended.

D. Acrylic acid-containing terpolymer

It is also respectfully submitted that Claim 17, which recites acrylic acid-containing terpolymers, further distinguishes from the cited reference. The Office action asserts component

(C) is optional in the claimed invention. However, this is incorrect for a number of claims, for example Claims 10, 12, 17, 40, 45, 46 and 48. As stated above, Fink et al. expressly teaches acrylic acid moieties are disadvantageous in many cases.

Applicants again note Claim 17 recites the polymer of Claim 7, selected from the group consisting of:

poly(HEA-co-DMAM-co-AA) terpolymer,
poly(HPA-co-DMAM-co-AA) terpolymer, and
poly(PEG-acrylate-co-DMAM-co-AA) terpolymer.

If the elected species is found allowable, it is respectfully requested a reasonable number of other species, for example, at least those of Claim 17, should also be examined.

VI. Conclusion

In view of the current amendments to the claims and the reasons set forth above, it is respectfully submitted that all objections and rejections have been overcome. Thus, a Notice of Allowance is respectfully requested.

Respectfully submitted,

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